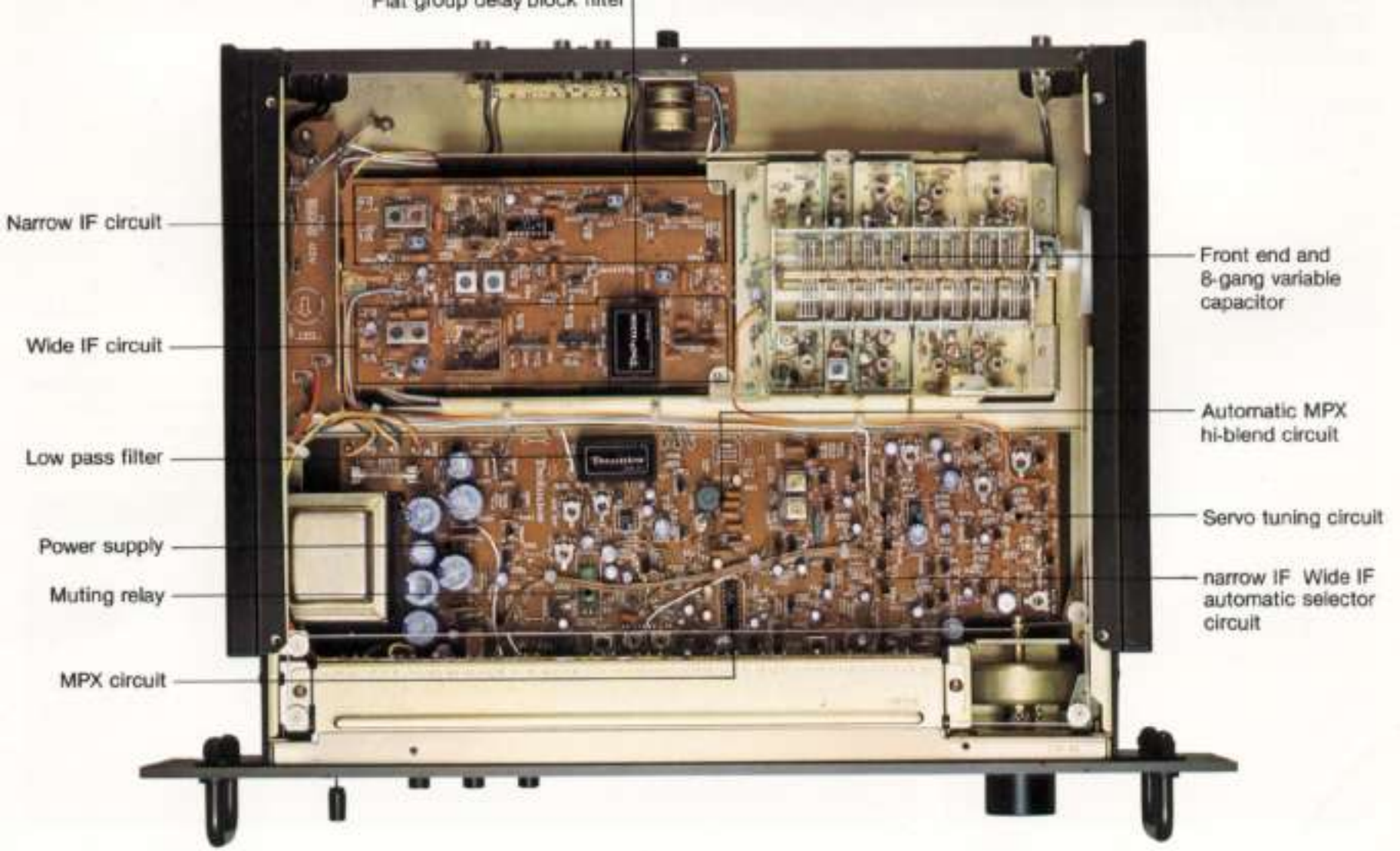
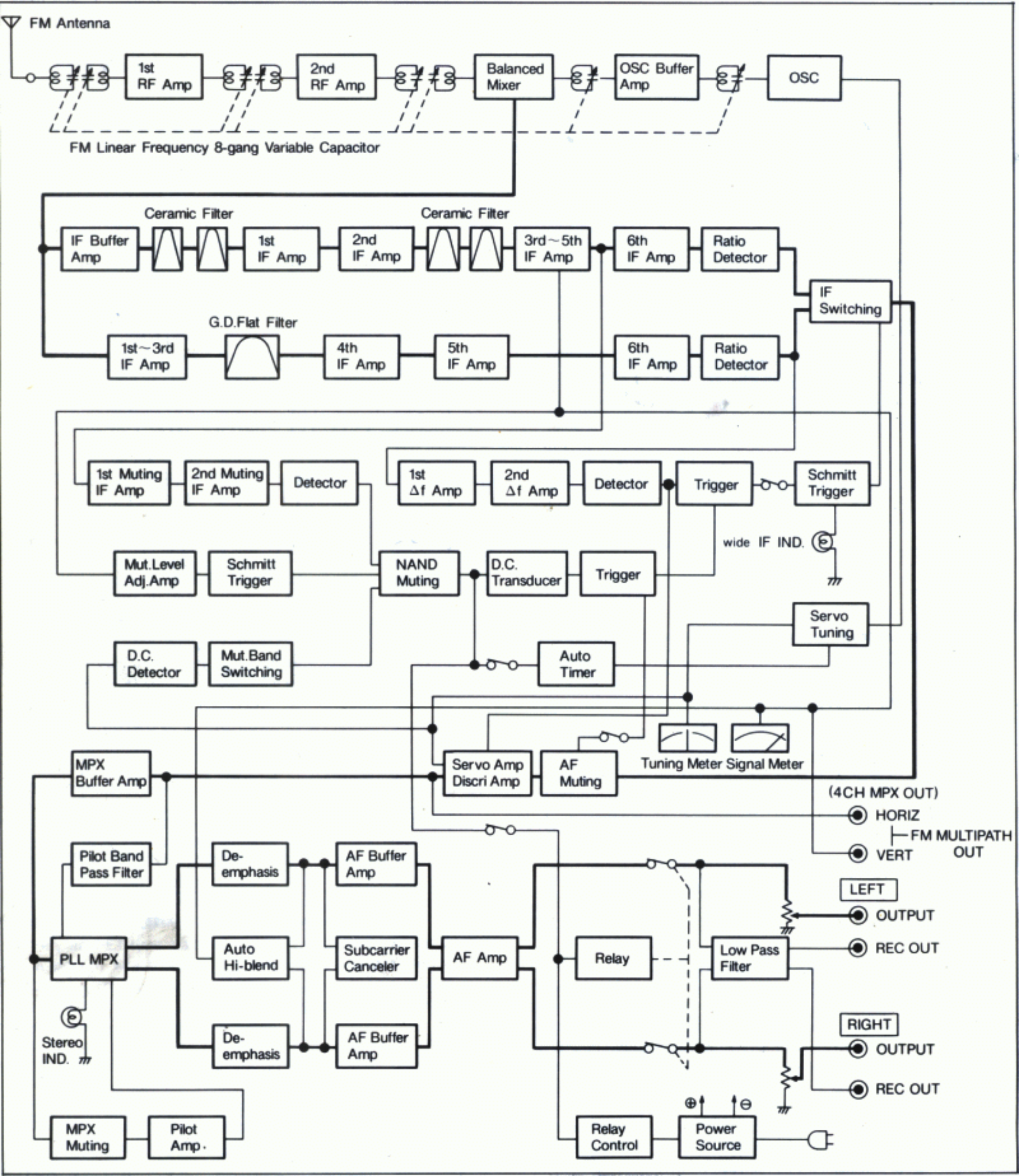
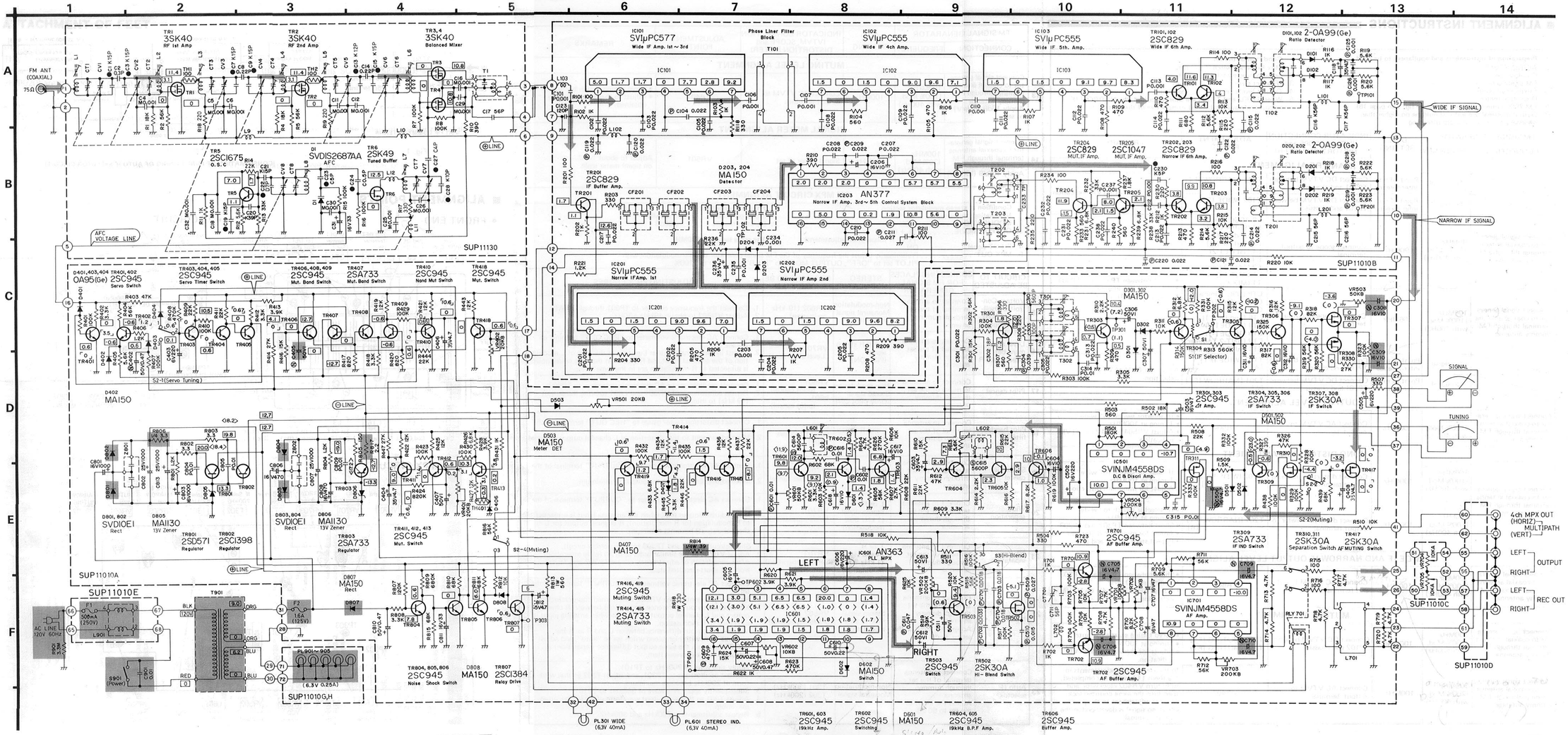
FM 88 90 92 94 96 98 100 102 104 106 108 MHz
tuning
power
on
off
mpx hi-blend
auto off
servo tuning
auto/muting on off
IF select
auto wide
wide
stereo
FM
tuning
signal
Technics
by Panasonic
FM Stereo Tuner ST-9030


Flat group delay block filter
Narrow IF circuit
Wide IF circuit
Low pass filter
Power supply
Muting relay
MPX circuit
Front end and
8-gang variable
capacitor
Automatic MPX
hi-blend circuit
Servo tuning circuit
narrow IF Wide IF
automatic selector
circuit


FM Antenna
1st RF Amp
2nd RF Amp
Balanced Mixer
OSC Buffer Amp
OSC
FM Linear Frequency 8-gang Variable Capacitor
Ceramic Filter
Ceramic Filter
IF Buffer Amp
1st IF Amp
2nd IF Amp
3rd～5th IF Amp
6th IF Amp
Ratio Detector
IF Switching
G.D.Flat Filter
1st～3rd IF Amp
4th IF Amp
5th IF Amp
6th IF Amp
Ratio Detector
1st Muting IF Amp
2nd Muting IF Amp
Detector
1st Δf Amp
2nd Δf Amp
Detector
Trigger
Schmitt Trigger
wide IF IND.
Mut.Level Adj.Amp
Schmitt Trigger
NAND Muting
D.C. Transducer
Trigger
Servo Tuning
D.C. Detector
Mut.Band Switching
Auto Timer
Tuning Meter
Signal Meter
MPX Buffer Amp
Servo Amp Discri Amp
AF Muting
(4CH MPX OUT)
HORIZ
FM MULTIPATH OUT
VERT
Pilot Band Pass Filter
De-emphasis
AF Buffer Amp
LEFT
OUTPUT
REC OUT
PLL MPX
Auto Hi-blend
Subcarrier Canceler
AF Amp
Relay
Low Pass Filter
Stereo IND.
De-emphasis
AF Buffer Amp
RIGHT
OUTPUT
REC OUT
MPX Muting
Pilot Amp.
Relay Control
Power Source


TR1 3SK40 RF 1st Amp
TR2 3SK40 RF 2nd Amp
TR3,4 3SK40 Balanced Mixer
FM ANT (COAXIAL)
75Ω
TR5 2SC1675 O.S.C
D1 SVDIS2687AA AFC
TR6 2SK49 Tuned Buffer
AFC VOLTAGE LINE
SUP11130
IC101 SVIμPC577 Wide IF Amp. 1st ~ 3rd
Phase Liner Filter Block
T101
IC102 SVIμPC555 Wide IF 4th Amp.
IC103 SVIμPC555 Wide IF 5th. Amp.
TR101, 102 2SC829 Wide IF 6th Amp.
D101, 102 2-OA99(Ge) Ratio Detector
WIDE IF SIGNAL
TR201 2SC829 IF Buffer Amp.
D203, 204 MA150 Detector
IC203 AN377 Narrow IF Amp. 3rd~5th Control System Block
TR204 2SC829 MUT. IF Amp.
TR205 2SC1047 MUT. IF Amp.
TR202, 203 2SC829 Narrow IF 6th Amp.
D201, 202 2-OA99(Ge) Ratio Detector
NARROW IF SIGNAL
SUP11010B
IC201 SVIμPC555 Narrow IFAmp. 1st
IC202 SVIμPC555 Narrow IF Amp 2nd
D401, 403, 404 TR401, 402 OA95(Ge) 2SC945 Servo Switch
TR403, 404, 405 2SC945 Servo Timer Switch
TR406, 408, 409 2SC945 Mut. Band Switch
TR407 2SA733 Mut. Band Switch
TR410 2SC945 Nond Mut Switch
TR418 2SC945 Mut. Switch
S2-1(Servo Tuning)
D402 MA150
D503 MA150 Meter DET
VR501 20KB
D301, 302 MA150
TR301, 303 2SC945 1st Amp.
TR304, 305, 306 2SA733 IF Switch
TR307, 308 2SK30A IF Switch
VR503 50KB
S1(IF Selector)
SIGNAL
TUNING
D801, 802 SVDIOE1 Rect
D805 MAII30 13V Zener
TR801 2SD571 Regulator
TR802 2SC1398 Regulator
D803, 804 SVDIOE1 Rect
D806 MAII30 13V Zener
TR803 2SA733 Regulator
TR411, 412, 413 2SC945 Mut. Switch
S2-4(Muting)
D407 MA150
TR414 2SA733 Muting Switch
TR416, 419 2SC945 Muting Switch
IC601 AN363 PLL MPX
LEFT
RIGHT
S3(Hi-Blend)
TR601 2SC945 Switch
TR502 2SK30A Hi-Bland Switch
D602 MA150 Switch
IC501 SVINJM4558DS D.C & Discri Amp.
TR701 2SC945 AF Buffer Amp.
TR309 2SA733 IF IND Switch
TR310, 311 2SK30A Separation Switch AF MUTING Switch
TR417 2SK30A
IC701 SVINJM4558DS AF Amp.
TR702 2SC945 AF Buffer Amp.
S2-2(Muting)
4ch MPX OUT (HORIZ.)
MULTIPATH (VERT.)
LEFT
RIGHT
OUTPUT
LEFT
RIGHT
REC OUT
SUP11010C
SUP11010D
SUP11010A
SUP11010E
T901
AC LINE 120V 60HZ
S901 (Power)
F1 500mA (250V)
F2 16A (125V)
PL901~905 (6.3V 0.25A)
SUP11010G,H
TR804, 805, 806 2SC945 Noise Shock Switch
D808 MA150
TR807 2SC1384 Relay Drive
PL301 WIDE (6.3V 40mA)
PL601 STEREO IND. (6.3V 40mA)
TR601, 603 2SC945 19kHz Amp.
TR602 2SC945 Switching
D601 MA150
TR604, 605 2SC945 19kHz B.P.F Amp.
TR606 2SC945 Buffer Amp.

■ ALIGNMENT INSTRUCTIONS

- **Preparation of instruments and appliances to be used.**

1. AC/DC VTVM
2. Oscilloscope
3. FM signal generator
4. Frequency counter
5. Distortion meter
6. FM 75Ω dummy antenna (Refer to fig. 1 on page 18)
7. Output of signal generator should be no higher than necessary to obtain an output reading.

- **Condition of the set**

1. Mpx hi-blend switch . . . . . off
2. Servo tuning switch . . . . . off
3. IF select switch . . . . . auto
4. Output level control. . . . maximum
5. When TP302 and TP303 are short-circuited, the NARROW IF circuit is always established irrespective of the IF switch.

	FM SIGNAL GENERATOR		DIAL SETTING	INDICATOR CONNECTION (VTVM, SCOPE and DISTORTION METER)	ADJUSTMENT POINTS	REMARKS
	CONNECTION	FREQUENCY				
	IF AND RF ALIGNMENT					
1		No- signal	Point of non-inter-ference	Connect DC VTVM between TP201 and chassis.	T201 (NARROW IFT) [A]	Adjust for 0mV of VTVM indication
2		No-signal	Point of non-inter-ference	Connect DC VTVM between TP101 and chassis.	T102 [WIDE IFT) [A]	
3	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	90MHz (100% Mod. with 400Hz)	90MHz	Connect scope to output terminal.	L8 (OSC Coil) L7 (Buffer Coil) L6 (2nd DET-2) L5 (2nd DET-1) L4 (1st DET-2) L3 (1st DET-1) L2 (ANT-2 Coil) L1 (ANT-1 Coil) T1 (MIX Coil)	• Short between TP302 and TP303 • Adjust for maximum output. • Repeat steps (1), (3) and (4).
4	Connect signal generator to coaxial antenna terminal thorugh FM dummy antenna.	106MHz (100% Mod. with 400Hz)	106MHz	Connect scope to output terminal.	CT8 (OSC Trimmer) CT7 (Buffer Trimmer) CT6 (2nd DET-2) CT5 (2nd DET-1) CT4 (1st DET-2) CT3 (1st DET-1) CT2 (ANT-2 Trimmer) CT1 (ANT-1 Trimmer)	
5		No-signal	Point of non-inter-ference	Connect DC VTVM between TP101 and chassis	T102 [WIDE IFT] [A]	Adjust for 0mV of VTVM indication
6		No-signal	Point of non-inter-ference	Connect DC VTVM between TP201 and chassis	T201 [NARROW IFT] [A]	
	OUTPUT LEVEL ALIGNMENT					
7	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal	VR504	• IF selector switch to "wide" • Tuning at 100MHz. • Adjust VR504 to 1.4V on VTVM indication
	MONO DISTORTION ALIGNMENT					
8	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect distortion meter to output terminal	T102 (WIDE IFT) [B]	• IF selector switch to "wide" • Tuning at 100MHz • Adjust for minimum distortion
9		100MHz (100% Mod. with 400Hz)	100MHz	Connect distortion meter to output terminal	T201 (NARROW IFT) [B]	• IF selector switch to "wide" • Tuning at 100 MHz • Short between TP302 and TP303 • Adjust for minimum distortion. • Repeat steps (8),(9) and (7).
	WIDE IF AND NARROW IF OUTPUT LEVEL ALIGNMENT					
10	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal.	VR503	• Short between TP302 and TP303. • Tuning at 100 MHz • Adjust VR503 to 1.4V on VTVM indication.
	MUTING ALIGNMENT					
11	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect DC VTVM between TP102 and chassis.	T202 (MUTING IFT) T203 (MUTING IFT)	• Servo tuning switch to "auto" • Tuning at 100 MHz • Adjust for maximum on VTVM indication.
12	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (200% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal.	VR402	In the state where adjustments in the them 11 have been completed, fully turn VR402 clockwise, and then turn the.same counterclockwise for adjustment to the point where no signal is developed at the output terminal.

	FM SIGNAL GENARATOR		DIAL SETTING	INDICATOR CONNECTION (VTVM, SCOPE and DISTORTION METER)	ADJUSTMENT POINTS	REMARKS
	CONNECTION	FREQUENCY				
	MUTING LEVEL ALIGNMENT					
13	Connect signal generator to coaxial antenna terminal through FM dummy antenna Apply 16dB (6.3μV) to set.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal.	VR401	• Servo tuning switch to "auto" • Adjust so that output can be obtained.
	SIGNAL METER ALIGNMENT					
14	Connect signal generator to coaxial antenna terminal through FM dummy antenna Apply 100dB (100mV) to set.	100MHz (30% Mod. with 400Hz)	100MHz	Signal meter of set	VR501	Adjust to about "4. 7" on siganl meter scale.

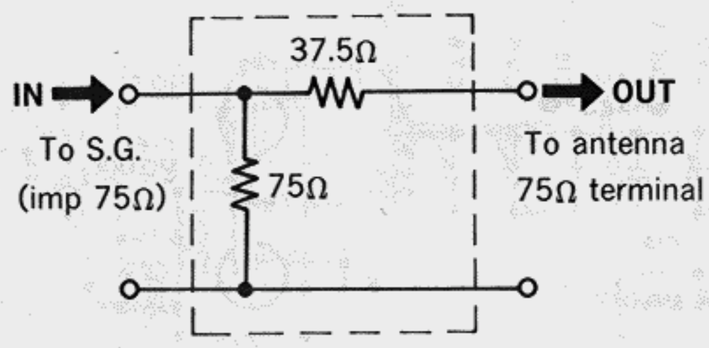
FM MPX CIRCUIT ALIGNMENT

- **Condition at stereo modulator section**
1. Modulating frequency 400Hz
2. MODULATION. 100%
3. OUTPUT MODE. . . . . { L + R / L or R (Separation adjustment)
4. PILOT signal . . . . . ON
5. MPX OUT. . . . . Preliminarily adjust the frequency of the FM signal generator to 90% modulation, with PILOT set to "OFF", OUTPUT MODE to "L + R" and MOD to "100%.

- **FM signal generator**
1. Signal generated 100MHz
2. Input to the set 60dB

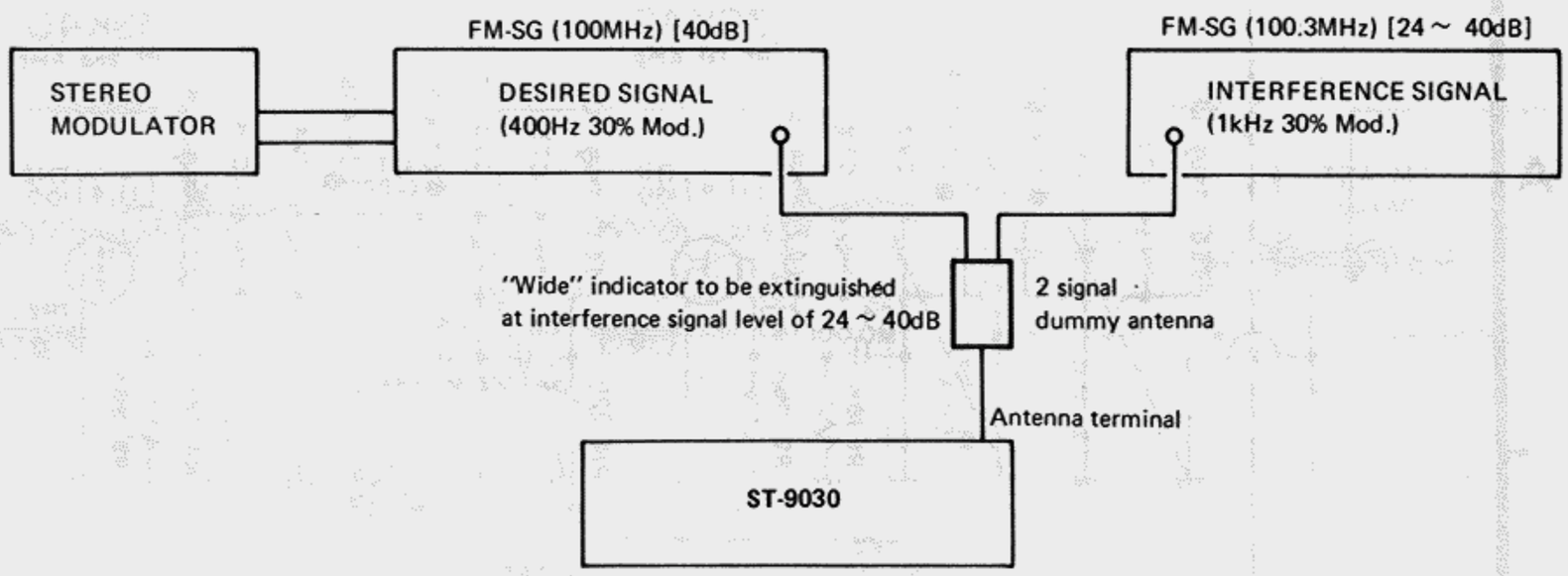
- **The set is tuned to 100MHz**

	CIRCUIT TO BE ADJUSTED	CONNECTING PLACES FOR FM SIGNAL GENERATOR	STEREO MODULATOR	PORTIONS TO BE ADJUSTED	ADJUSTING PROCEDURES
15	Voltage Controlled Oscillator (19kHz Oscillation)	Connect to antenna terminal of the set through dummy antenna	Non-modulation Monaural signal (Pilot OFF)	VR602 (19 kHz oscillation)	1. Connect the frequency counter to TP601 through 100kΩ. 2. Adjust VR602 to obtain 19kHz ±30Hz
16	Level alignment between L and R	Connect to antenna terminal of the set through dummy antenna	L and R stereo signal (Pilot ON)	VR702 (Level alignment)	1. Connect AC electronic voltmeter to "REC OUT" terminal of the set. 2. Adjust in such a manner that L output at the time of L modulation of the antenna input and R output at the time when input is subjected to R modulation are in the same level.
17	Pilot cancel	Connect to antenna terminal of the set through dummy antenna	Non-modulation Stereo signal (Only pilot ON)	VR601 (pilot cancel) L601 (pilot cancel)	1. Connect oscilloscope or AC electronic voltmeter to TP602. 2. Repeat adjustments of VR601 and L601 to bring the output (19 kHz) to minimum.
18	Pilot bandpass filter	Connect to antenna terminal of the set through dummy antenna	L and R stereo signal	L602 (pilot Bandpass filter)	1. Connect distortion factor gauge to "REC OUT" terminal of the set. 2. Make adjustment so that distortion of L channel output becomes minimum.
19	Subcarrier cancel	Connect to antenna terminal of the set through dummy antenna	Non-modulation Stereo signal	CT701 (Subcarrier cancel)	1. Connect AC electronic voltmeter to "OUTPUT" terminal of the set. 2. Make adjustment to bring the output to minimum.
20	Wide separation	Connect to antenna terminal of the set through dummy antenna	L or R Stereo signal (1 kHz 30% modulation)	VR701 (Wide separation)	1. Connect AC electronic voltmeter to "OUTPUT" terminal of the set. 2. Make adjustments so that, when the antenna input is subjected to L modulation (or R modulation), R channel output (or L channel output) becomes minimum.
21	Narrow separation	Connect to antenna terminal of the set through dummy antenna	L or R Stereo signal (1 kHz 30% modulation)	VR703 (Narrow separation)	1. Short-circuit TP302 and TP303 to form narrow circuit. 2. Adjust VR703 in the similar order as in 20 (wide separation). 3. After completion of adjustments, release TP302 and TP303 from the short-circuited state.
22	Auto high-blend	Connect to antenna terminal of the set through dummy antenna. Adjust the input to the set to 31 dB	L or R Stereo signal (1 kHz 30% modulation)	VR502 (Auto high-blend)	1. Connect AC electronic voltmeter to "OUTPUT" terminal of the set. 2. Before adjustments, keep VR502 fully turned counterclockwise. 3. Measure the output difference (separation) between R channel output and L channel output at the time when antenna input is subjected to L modulation. 4. Measure the output difference between L and R as in the previous item, with high-blend witch set to "auto", and adjust VR502 to obtain the same output difference (separation) as measured in the previous item.
23	Auto IF selector	Connect to antenna terminal of the set through dummy-antenna. Adjust the input to the set to 60 dB.	Non-modulation Monaural signal	T301 (300kHz) T302 (200kHz)	1. Apply sine wave of 200kHz to TP101. 2. Connect oscilloscope to TP301, and adjust T302 so that waveform of 200kHz becomes maximum. 3. Subsequently apply sine wave of 300kHz to TP101. 4. Adjust T301 so that the output waveform of TP301 becomes maximum. 5. Repeat adjustments at 200kHz and 300kHz.



75Ω FM DUMMY ANTENNA

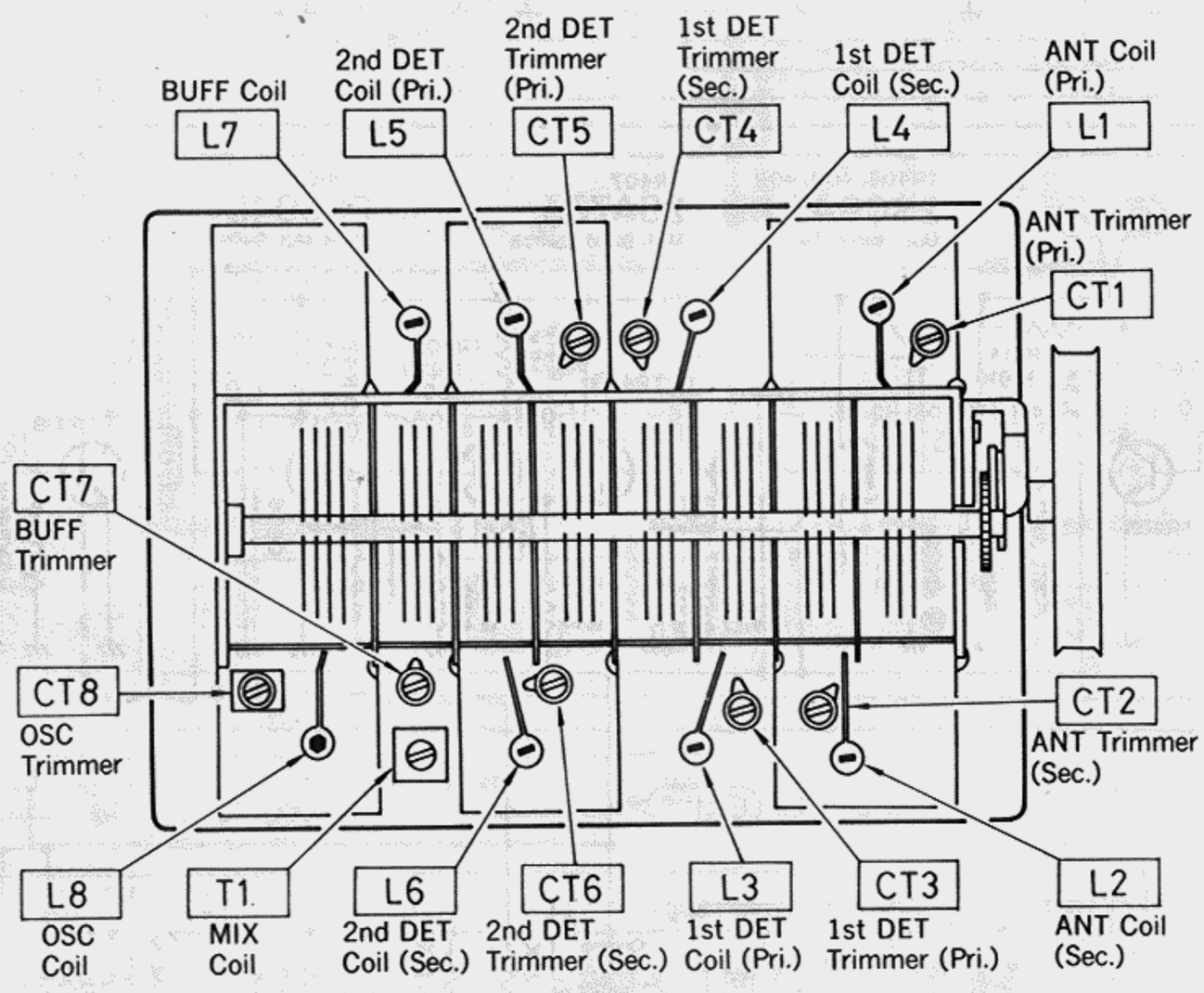
Fig. 1



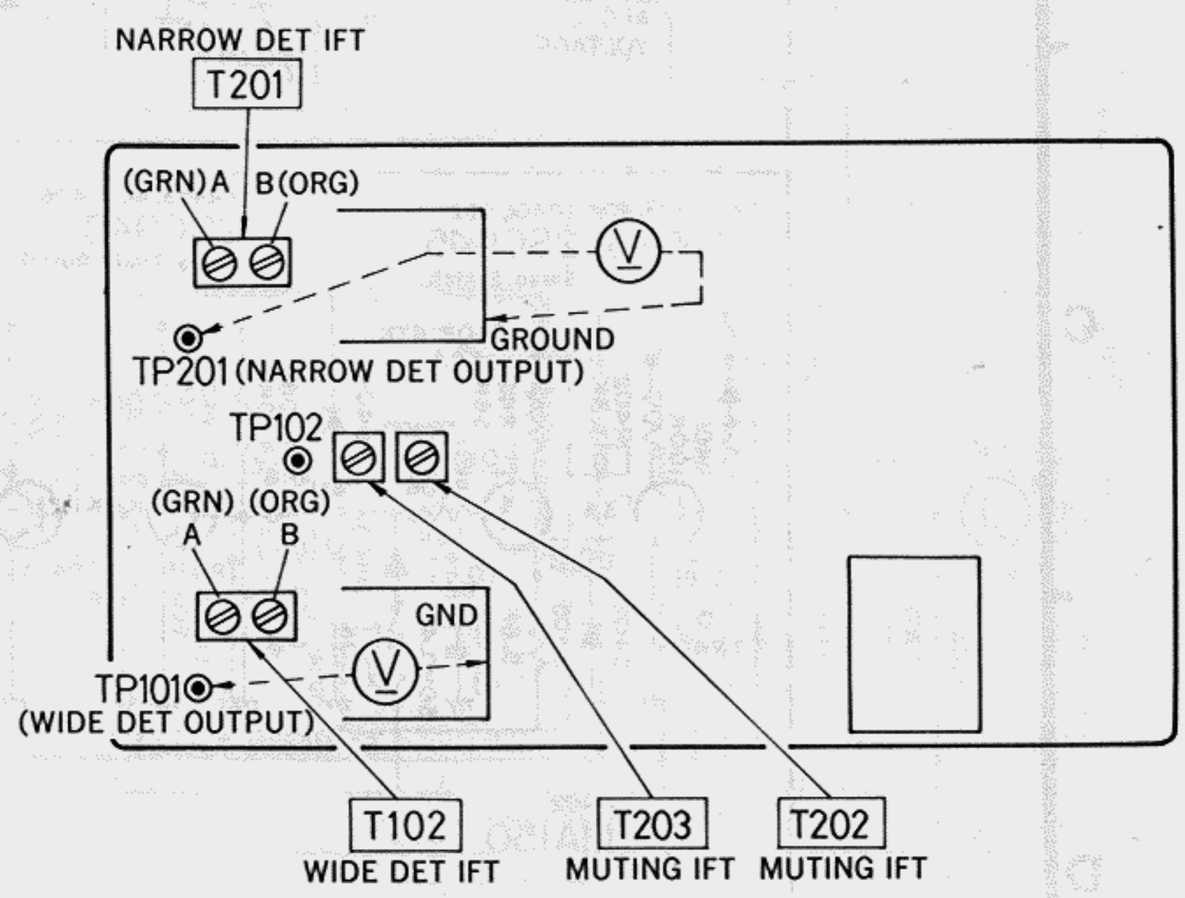
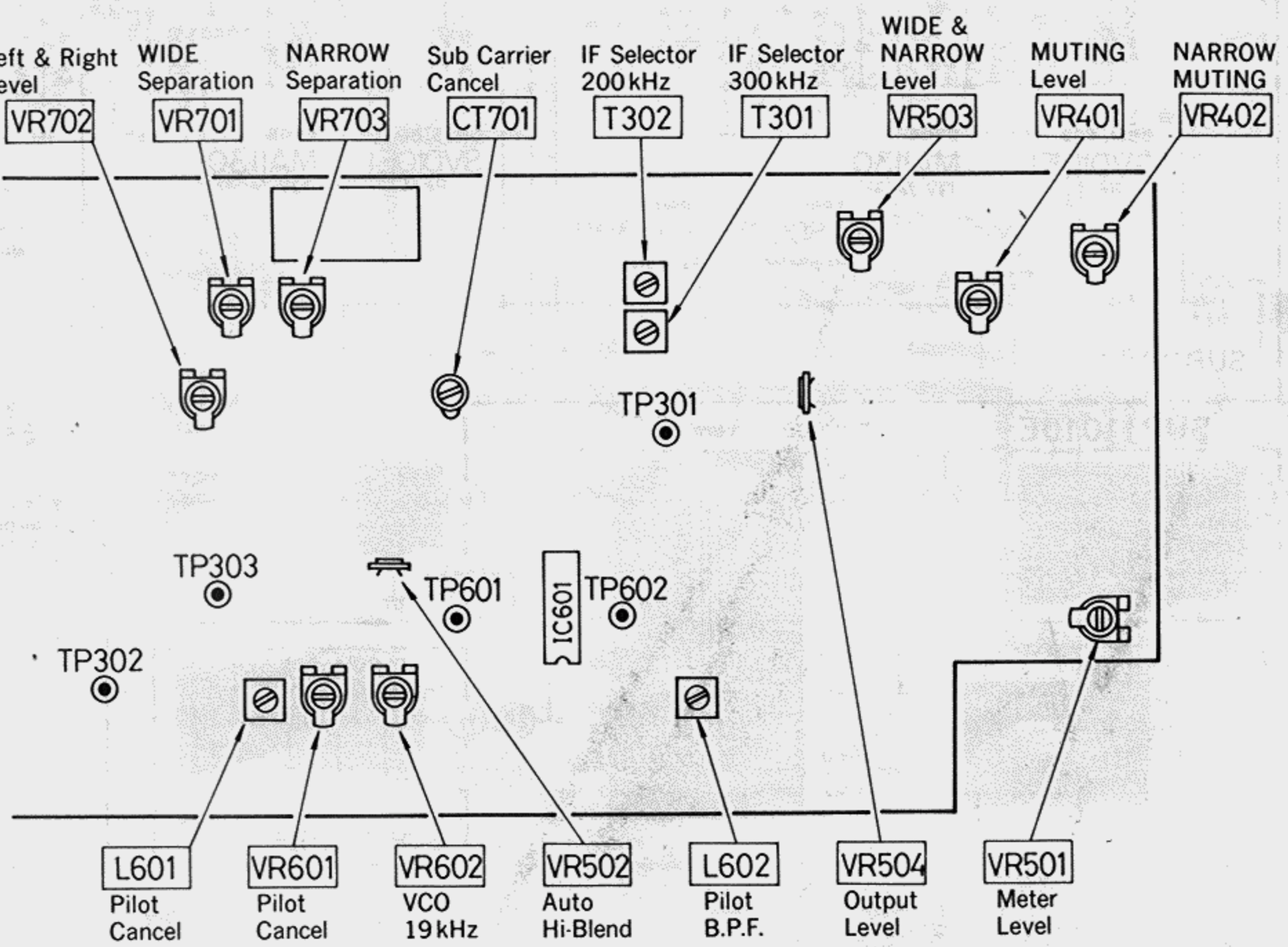
(CONFIRMATION OF FUNCTIONING OF AUTO IF SELECTOR CIRCUIT)

■ ALIGNMENT POINTS

• FRONT END



• IF CIRCUIT



• MPX CIRCUIT